

The average life of the ordinary *O. virginica* when "planted" for sale is about four or five years. In prehistoric times, when the reefs were undisturbed, the favored individual might attain a much greater age; in which case the lower valve especially took on excessive thickness, and the cavity of the shell often became considerably elongated and somewhat hour-glass-shaped, as in *O. contracta* Conr., whose characters in typical specimens are distinctly senile, while younger specimens of the same species have the normal form.

In the hinge of the oyster the resilium occupies the central ridge, while the ligament covers the edge of the depressions on each side of that ridge. The form and relative position of the muscular scar of the adductor is, within certain limits, a useful character, but its depression below the general interior surface of the valve or its occasional elevation above it, as in *Plicatula*, is of no systematic value, being merely a corollary of the rate of growth from the various secreting surfaces. The habit of rapid growth, causing a vesicular character of the shell substance, is more pronounced in some species than in others, and in some specimens of a species than in others; it is rarely the case that this habit (as in *O. percrassa* Conr.) has attained a constancy entitling it to systematic significance.

AN ATTEMPT TO DEFINE THE NATURAL GROUPS OF STROMBUS.

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(*Pterocera continued.*)

1. Lip armed with *closed spines*,
- a. Within *smooth, orange*.

(*Heptadactylus.*)

Pt. aurantia, lambis, bryonia.

Distr.: Red Sea and Mauritius to Japan, Australia and Polynesia.

- b. Within *wrinkled, violet*,

(*Millipes.*)

Pt. scorpio, pseudoscorpio, millipeda, elongata.

Distr.: Zanzibar and Mauritius to Japan and New Guinea.

2. Lip deeply cut into numerous *open lobes*, within *finely, deeply, regularly grooved*.

Pt. violacea. Indian O., Zanzibar.

The last species is certainly quite distinct, but the other two minor groups are of slight value, the apertural wrinkles being a dynamical feature incipient in *lambis* itself.

GROUP F (*Harpago*.)

Here the *antesinual lobe* gives rise to one of the great claws, a feature unique among living Strombs, and sundering it widely from the previous group, from which Dr. Gill long ago divorced it.

H. chiragra, rugosa.

Distr. : Zanzibar to Japan and Polynesia.

The six groups previously considered agree in the strong and heavy shells, usually of large size, with spreading callus. Those which follow are usually rather small and of lighter structure, and have the inner lip restricted or defined.

GROUP G (*Gallinula*.)

Shell usually light, elegant; *antesinual lobe diminished*, lip *expanded medially*, descending rapidly from the suture with a broad sinuation; posterior canal narrow, *hugging the spire*; body somewhat flattened in front of the aperture, usually with four or five sagittate color bands; the early whorls with small varicose ribs at intervals.

Contents as given by Tryon, with the probable addition of *S. pulchellus*, which is unknown to me autoptically.

Distribution: Red Sea and Zanzibar to Japan and Polynesia.

S. canarium, isabella.

Red Sea to Japan and Australia.

The last two species, erroneously grouped with the American forms by Tryon, but correctly placed by Chenu and others, are aberrant in their heavier growth, obscure posterior canal and undefined inner lip. These differences, however, hardly seem to warrant the institution of a sub-group.

GROUP H (*Conomurex*.)

Shell *conoid*, often distorted; lip with margin rather straight and incurled, *posterior sinus deep*, *anterior sinus distinct*, *oblique*, remote from the canal; inner lip narrow, scarcely defined; color bands sagittate.

S. lukuanus, mauritianus, fasciatus, gibberulus.

Distribution: Red Sea and Natal to Japan and Polynesia.

Forms of *fasciatus* approach closely to the variety *coniformis* of *mauritianns*, and the aperture of the former species is indifferently smooth or finely ridged. It, therefore, becomes necessary to enlarge the group. *S. luhuanus* has the epidermis thickly lamellose, almost velvety. The sagittate bands are more numerous than in the preceding group.

GROUP J (*Canarium*).

Shell small, but solid; *posterior sinus absent*, posterior canal a *slight groove in the calloused angle* at the suture; anterior sinus very near the canal; aperture finely ridged; lip margin with an *external rib*, but not expanded.

S. ustulatus, *dentatus*, *corrugatus* and *var. elegans*, *urceus* (= *floridus*), *hæmastoma*, *helli*, *scalariformis*, *maculatus*.

Distribution: Red Sea to Hawaii and Australia.

In form and sculpture, *S. elegans* is very suggestive of *Rimella*, but the exaggerated canals of the latter genus sufficiently distinguish it.

Sub-group J 2.

Surface smooth or with low vertical folds, *polished*; lip sinus almost *merged into the canal*; body *drawn out*, narrowed. *S. samar* (*bulbulus*, *terebellatus*). Distr.: Japan to Australia and Polynesia.

The last two species are not before me, but apparently they are allied to *samar* and indicate close affinity of this group with the following. The accessory sinuses developed in *samar* must not be confused with the true lip-sinus.

GROUP K (*Seraphs*).

In this group, which need not be redefined, we find the culmination of the features incipient in *samar*. The lip-sinus is broad, basal and merged in the canal. The beautiful color-forms of the single protean living species of "*Terebellum*" inhabit the Indo-Pacific region from Mauritius to Japan and the Fijis.

GROUP L (*Rimella*).

Not studied. The living forms inhabit Chinese and Philippine waters.

GROUP M (*Rostellaria*).

Not studied. Red Sea to China and Moluccas.

The groups above recognized are probably by no means all of equal

rank. Nevertheless, each appears to be clearly distinct from all the others, and no species occur which cannot be at once referred to one or another of them. Whether they may be recognized as genera is mainly a question of personal opinion, but it seems evident to me, as I have intimated in several places, that the extreme forms, such as *Pterocera* and *Terebellum*, to which the older authors have unanimately given generic rank, are in nature more closely allied to the various types gathered into the old genus *Strombus* than the latter are to each other. One more relationship should be pointed out, namely, that apparently existing between groups G, H and J. It remains for the palæontologist and anatomist to verify or correct deductions based on the recent shells alone, and I await their final judgment.

SUPPLEMENTARY NOTES.

Strombus goliath.—Ponderous and distorted specimens of *gigas* are sometimes mistaken for this species, probably because Tryon remarks: "perhaps a variety of *S. gigas*." Not long since, I had the good fortune to find a very fine example of the true *goliath* lying unknown and unhonored in a collection once famous but forgotten. So completely does it differ from all its cousins that none need ever mistake it. Through the munificence of Pres. Jesup, this king of Strombs is now enthroned at last in the American Museum, New York City.

Strombus costatus inermis.—Mr. Frederick Stearns reports "1 live mature shell" of this species from the Loo Choo Islands. Can a form so commonly reported from the West Indies be also living in Oriental waters? Or has an error crept in?

Strombus corrugatus.—I have been led to separate this (above) from *dentatus*, and to consider *elegans* a variety of it, judging by the material at hand. A few other forms, usually considered varieties, are restored to specific rank, merely as an expression of personal opinion.

Distribution: The *Strombinae* occupy two great areas: An American, centering in the West Indies and spreading to Senegal, Brazil, and West America; and an Oriental, apparently centering in the Philippines, reaching to Natal, the Red Sea, Japan, Hawaii and the South Seas, and sending a single species (*granulatus*) into American waters. Europe has no living forms, although rich in fossil ones.